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**Civilian Radioactive Waste Management System
Management and Operating Contractor**

**Enhanced Characterization of the Repository Block
Requirements Document (ECRB-RD)**

March 18, 1998

BAB000000-01717-5705-00013, Rev 01

Prepared for:

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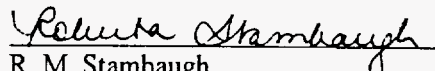
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CHANGE HISTORY

<u>Rev/ Change Number</u>	<u>Date</u>	<u>Description and Reason for Change</u>
0	06/13/97	Initial issue as unapproved, non-Q document under QAP-3-12, with TBV-227
1	03/98	Issued as a Q document under Procedure QAP-3-5

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I. INTRODUCTION

This Enhanced Characterization of the Repository Block Requirements Document (ECRB-RD) provides applicable design and construction requirements for the Enhanced Characterization of the Repository Block (ECRB) East-West Drift and its associated equipment. This document also identifies the applicable requirements from the Exploratory Studies Facilities Design Requirements (ESFDR) Document (YMP/CM-0019, Revision 2, ICN-1) for design and construction of the ECRB East-West Drift, ground support, constructor support utilities and components. These requirements have been tailored specifically for the ECRB East-West Drift design and construction. The allocated requirements for the ECRB East-West Drift are in Sections III through VI. The requirements in sections III through VI contain requirement numbers from the ESFDR, Rev 2, ICN-1 for reference back to the ESFDR. Each requirement in the ECRB-RD also identifies a trace to the Site Design and Test Requirements Document (YMP/CM-0021, Rev. 2, ICN-1) and 10CFR60 similar to the style used in the ESFDR. These traces to 10CFR60 are consistent with the 1995 version of 10CFR60 used by the SD&TRD and the ESFDR. Those ESFDR requirements statements that were technically modified are identified as such and those that were derived as part of this allocation are also identified.

An activity evaluation has been performed in accordance with QAP-2-0 and has determined that the QA program is applicable to this document. Therefore, the development of this document was performed in compliance with QAP-3-5, Revision 7, Development of Technical Documents and checked and reviewed in compliance with Section 5.3. This is consistent with the IOC from R. Stambaugh to M. Lugo on the subject of ECRB-RD, Revision 1, TDPP Applicability” (LV.SEI.,RMS.03/98-012, Dated 3/12/98)

The ECRB East-West Drift includes those excavated underground openings to support enhanced characterization testing activities for the repository block and provides potential extension for access to the Calico Hills formation. These openings may include a launch chamber, drifts, alcoves, and niches. The ECRB East-West Drift will contain a ground support system, which will control the configuration and stability of the opening and provide personnel protection against potential falls of loose rock.

The ECRB East-West Drift will contain those temporary/constructor support subsurface systems required to support construction and testing that occur during the construction of the drift. These constructor support systems may include utilities (power, supply water, communications, lighting, ventilation, waste water, compressed air, fire protection, and monitoring and warning systems), muck removal, material and personnel transport, sanitary facilities, and their associated mounting hardware.

Most of the design and construction constraints from Section 3.2.1.2.3 and other application specific sections of the ESFDR were not specified in this document because they were captured in the “Determination of Importance Evaluation for the ESF Enhanced Characterization of the Repository Block Drift (Phases I and II)” (BABEAF000-01717-2200-00011). In addition, QA Classification analyses have been performed to determine which items in the ECRB East-West

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Drift are permanent function items and to identify QA controls associated with them. These are:

- 1) "QA classification Analysis of Main Access Openings
(CI: BABEAD000)" (BABEAD000-01717-2200-00002)
- 2) "QA Classification Analysis of Test Support Areas
(CI: BABEAF000)" (BABEAF000-01717-2200-00001)
- 3) QA Classification Analysis of Ground Support Systems
(CI: BABEE0000)" (BABEE0000-01717-2200-00001)

II. ESF SYSTEM REQUIREMENTS

Section 3.2.1.1 of the ESFDR document contains requirements that apply to the ESF as a system. Consistent with the Program direction in the Civilian Radioactive Waste Management System Requirements Document (DOE/RW-0406, Rev 3), the Mined Geologic Disposal System Requirements Document (YMP/CM-0025, Rev 03) has been updated to prescribe that the governing safety regulation for underground construction is 29CFR1926. In addition DOE ORDER 440.1 has been specified as the applicable safety order for the Project. Requirement 3.2.1.1.2.4.H of the ESFDR is scheduled to be updated to specify that only 29CFR1910 and 29CFR1926 apply to subsurface facilities and equipment. This change has been implemented in this ECRB East-West Drift requirements document.

III. ECRB EAST-WEST DRIFT OPENING

The complete set of ECRB East-West Drift Opening requirements is obtained by combining the requirements from Sections III and VI.

- 3.2.1.2.3.G** All excavation blasting shall be designed to control over break to minimize impacts to waste isolation and/or site characterization testing.
[DERIVED][SD&TRD I.3.7.2.1.C.1.A, I.3.7.2.2.C.1.A, I.3.7.2.3.C.1.A, I.3.7.2.5.C.1.A, I.3.7.2.6.C.1.A][10 CFR 60.15(c)(1)]
- 3.7.2.1.1.D** All coordinates shall be in accordance with the Nevada State Plane Coordinate System and be traceable to existing first-order control points in or around Area 25.
[DERIVED][SD&TRD I.3.3.1.A, I.3.3.1.B]
- 3.7.2.1.2.B** The ECRB East-West Drift Opening design, construction, and in situ testing shall be planned and coordinated with the repository design.
[DERIVED][SD&TRD I.3.7.2.5.B.2.2.B][10CFR60.15(c)(4)]
- 3.7.2.1.2.C** The ECRB East-West Drift Opening shall be designed, constructed, and maintained consistent with the quality controls and record keeping requirements expected for permanent items.
[SD&TRD I.3.4.5, I.3.4.6A]

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- 3.7.2.1.2.D Appropriate gravity drainage and/or pumping systems shall be incorporated for draining water away from testing and other work areas to suitable collection points for further treatment and/or disposal.
[DERIVED][SD&TRD I.3.7.2.5.C.1.D][10CFR60.15(c)(1)]
- | 3.7.2.1.2.F The construction of the ECRB East-West Drift Opening shall incorporate use of mechanical excavation or controlled drill-and-blast methods.
[DERIVED][SD&TRD I.3.7.2.5.D.2.20][10CFR60.133(f)]
- 3.7.2.1.2.I To the extent practicable, drilling with water into known large-aperture fractures shall be avoided.
[DERIVED]
- | 3.7.2.5.1.C The ECRB East-West Drift Opening shall be designed to support the required tests identified in Appendix B of the Exploratory Studies Facility Design Requirements (ESFDR) Document, YMP/CM-0019, Revision 2, ICN-1.
[DERIVED][SD&TRD I.3.7.2.5.B.1.4.A, I.3.7.2.5.D.1.8, I.3.7.2.5.D.2.1, I.3.7.2.5.D.3.2, I.3.7.2.5.D.3.3, I.3.7.2.5.D.3.4, I.3.7.2.5.D.3.6, I.3.7.2.5.D.3.7, I.3.7.2.5.D.3.8]
[10CFR60.137, 10CFR60.140(b), 10CFR60.140(c), 10CFR60.141(a), 10CFR60.141(b), 10CFR60.141(c), 10CFR60.141(d), 10CFR60.15(b), 10CFR60.74(b)]

IV. ECRB GROUND SUPPORT SYSTEM

The complete set of ECRB East-West Drift Ground Support System requirements is obtained by combining the requirements from Sections IV and VI.

- | 3.2.1.2.1.2.A The permanent function (TBV-193-ESF) and temporary function ECRB East-West Drift ground support shall be designed to withstand the applicable seismic environment specified in Appendix A of the ESFDR Document, YMP/CM-0019, Revision 2, ICN-1.
[Derived][SD&TRD I.3.2.3.1.A, I.3.7.2.5.D.2.6][For permanent function, 10CFR60.131(b)(1)]

| With the exception of 3.7.3.1.J, the following requirements apply to the permanent function ground support system installed throughout the transition zone between the North Ramp and the ECRB East-West Drift. (Approximately 2.5 times the North Ramp opening diameter measured perpendicular from the centerline of the North Ramp.) 3.7.3.1.J applies to the entire ECRB East-West Drift.

- | 3.7.3.1.D (MODIFIED) The ground support system shall be compatible with the excavation methods and equipment, and support site characterization activities specified in Appendix B of the ESFDR Document, YMP/CM-0019, Revision 2, ICN-1.

[DERIVED]

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- 3.7.3.1.E The ground support system shall incorporate the use of noncombustible and heat resistant materials in the design.
[DERIVED][SD&TRD I.3.7.2.5.D.2.9][10CFR60.131(b)(3)(ii)]
- 3.7.3.1.F The ground support system shall be designed to permit periodic inspection, monitoring, testing, and maintenance, as necessary, to evaluate their readiness and to ensure their continued function.
[DERIVED][SD&TRD I.3.7.2.5.D.2.11, I.3.7.2.5.D.2.19]
[10CFR60.131(b)(6), 10CFR60.133(e)(2)]
- 3.7.3.1.G The ground support system shall be designed and installed throughout the North Ramp ECRB East-West Drift transition zone to reduce the potential for deleterious rock movement or fracturing.
[DERIVED][SD&TRD I.3.7.2.5.D.2.19][10CFR60.133(e)(2)]
- 3.7.3.1.J (MODIFIED) The ground support system shall be designed to have the capability to be supplemented as required.
[SD&TRD I.3.7.2.5.D.1.8, I.3.7.2.5.D.3.6, I.3.7.2.5.D.3.8]
[10CFR60.141(a), 10CFR60.141(b), 10CFR60.141(d)]
- 3.7.3.1.K The ground support system shall be designed with sufficient flexibility to allow adjustments where necessary to accommodate specific site conditions encountered during excavation or identified through in situ monitoring and testing.
[DERIVED][SD&TRD I.3.7.2.5.D.2.15][10CFR60.133(b)]

V. REQUIREMENTS APPLICABLE TO ALL ECRB EAST-WEST DRIFT CONSTRUCTOR SUPPORT UTILITIES

The complete set of ECRB East-West Drift Constructor Support Utilities requirements are obtained by combining the requirements from Section V and VI.

- 3.2.1.2.1.2.A (MODIFIED) Mounting of utilities shall consider seismic loading specified in Appendix A of the ESFDR Document, YMP/CM-0019, Revision 2, ICN-1.
[Derived][SD&TRD I.3.2.3.1.A, I.3.7.2.5.D.2.6]
- 3.8.2.1.2.D To the extent practical, ECRB East-West Drift utility systems and associated furnishings (hangers, brackets, etc.) shall be removable following final use.
[DERIVED][SD&TRD I.3.3.12.af, I.3.7.2.6.D.1.B]
- 3.8.2.1.2.G (MODIFIED) ECRB East-West Drift subsurface utilities shall support the testing utility requirements in Appendix B of the ESFDR Document, YMP/CM-0019, Revision 2, ICN-1 and the construction utility requirements.
[DERIVED][SD&TRD I.3.7.2.6.B.1.4.A, I.3.7.2.6.B.1.4.B]

VI. REQUIREMENTS APPLICABLE TO ALL ECRB EAST-WEST DRIFT COMPONENTS

The following requirements are applicable to the ECRB East-West Drift Opening, the ECRB East-West Drift Ground Support System, and the ECRB East-West Drift Constructor Support Utilities.

- 3.2.1.2.1.2.C The ECRB East-West Drift facilities and equipment shall be designed to withstand and operate in temperatures ranging from a low of 50 degrees F to a high of 70 degrees F.
[DERIVED][SD&TRD I.3.2.3.1.I]
- 3.2.1.2.1.2.D The ECRB East-West Drift facilities and equipment shall be designed to withstand and operate in a relative humidity environment of 13 to 71%.
[DERIVED][SD&TRD I.3.2.3.1.A]
- 3.2.1.2.2.A The ECRB East-West Drift non-permanent/temporary function items shall be designed for a 25 year maintainable service life. (Does not apply to constructor support ECRB East-West Drift components).
[DERIVED][SD&TRD I.3.2.2.4.A]
- 3.2.1.2.2.B The ECRB East-West Drift permanent function items shall be designed for a 150-year maintainable service life.
[DERIVED][SD&TRD I.3.2.2.4.B, I.3.7.2.5.D.2.2, I.3.7.2.5.D.2.16, I.3.7.2.5.D.2.18]
[10CFR60.3(a), 10CFR60.3(b), 10CFR60.111(b)(1), 10CFR60.133(c), 10CFR60.133(e)(1)]
- 3.7.1.2.A ECRB East-West Drift design bases shall be consistent with the results of site characterization.
[DERIVED][SD&TRD I.3.7.2.5.D.2.5][10CFR60.130]
- 3.7.1.2.B Records shall be developed and maintained, including as-built documentation, for the
(MODIFIED) following, as applicable:
- Locations and amount of seepage;
 - Details of equipment, methods, progress, and sequence of work;
 - Construction problems;
 - Anomalous conditions encountered;
 - Location and description of structural support systems;
 - Location and description of dewatering systems.
- [DERIVED][SD&TRD I.3.7.2.5.D.1.7][10 CFR 60.72(a), 10 CFR 60.72(b)]
- DERIVED 1 The ECRB East-West Drift Opening, ECRB East-West Drift Ground Support Systems and the ECRB East-West Drift Constructor Support Utilities shall be designed and constructed in compliance with applicable Determination of Importance Evaluations and Classification Analyses.
[DERIVED]

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DERIVED 2 The ECRB East-West Drift and its components shall be designed in compliance with the applicable portions of DOE Order 440.1 (9/95). Specifically, the Safety and Health Regulations for Construction, 29CFR1926, is applicable to the ECRB East-West Drift and Components

[Derived] [SD&TRD I.3.3.6.2.E.2, I.3.3.12] [ESFDR 3.2.1.1.2.4.I
as modified by MGDS-RD (Rev3) 3.1.E, 3.1.F]

VII. CONCLUSIONS

This document specifies the applicable requirements for the design and construction of the ECRB East-West Drift and its corresponding ground support, construction support utilities and components. The changes in the January 1, 1997 revision to 10CFR60 were evaluated and found not to have an impact to these requirements, other than numbering changes. For continuity with the existing requirements documents, including the ESFDR, the 10CFR60 numbers are not being updated at this time. These numbering changes of 10CFR60 requirements will be made during the next revision to the ESFDR, which will incorporate these ECRB requirements.

The method of verification for these ECRB East West Drift requirements are the same as specified in Section 4 of the ESFDR. The verification methods for the DERIVED 1 and DERIVED 2 requirements are by both analysis and examination.

DOE ORDER 440.1 is being specified as the governing order for safety. This order includes the Occupational Safety and Health Administration regulation, to which, the ECRB East West Drift will be designed. This is the "Safety and Health Regulations for Construction," 29 CFR 1926.